# VALVEMATE® II
# Valve Actuator
# User's Guide

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# Introduction 1

The Gilson VALVEMATE® II is a small-footprint valve actuator that provides automatic rotation of a 2-position or multi-position low- or high-pressure valve.

The VALVEMATE II is controlled by TRILUTION™ Software as well as the front panel, contact closures, and Gilson Serial Input/Output Channel (GSIOC).

# Unpacking

Unpack the VALVEMATE II and accessories carefully from the carton. Cross-check the contents against the standard equipment checklist shown below and against your purchase order's optional accessory list to verify that all parts are included and undamaged.

Do this now, even if the VALVEMATE II will not be used immediately. Many carriers must receive concealed damage claims within seven days of delivery.

## Standard Equipment

Once the VALVEMATE II and accessories are unpacked, you should have the following:

- VALVEMATE II with appropriate valve installed (if the valve was ordered along with the VALVEMATE II)
- 9/64" Allen wrench
- power supply, 24V desktop universal
- power cord 110V
- power cord 220V
- shielded GSIOC cable, 30"

Keep the original container and packing assembly in case the VALVEMATE II must be returned to the factory.

### Documentation

The following documents are included with the VALVEMATE II:

- VALVEMATE II Documentation CD
- IQ procedure booklet
- Unpacking the VALVEMATE II
- Declaration of Conformity

## Accessories

### Valves and Plumbing Packages

Based on your configuration, you may also receive one of the following valves and plumbing packages, ordered separately.

| ***Valve*** | | ***Plumbing Package*** | |
|---|---|---|---|
| ***Part Number*** | ***Description*** | ***Part Number*** | ***Description*** |
| 494C23006 | Preparative stainless steel valve (2-position, 6-port) 0.030" ID ports | 33035255 | Stainless steel—prep 0.030" ID x 1/16" OD tubing |
| 494C23000 | Preparative stainless steel valve (2-position, 10-port) 0.030" ID ports | | |
| 494C53006 | High-pressure stainless steel multi-position valve (6-position, 6-port) 0.030" ID ports | | |
| 494C22006 | Analytical stainless steel valve (2-position, 6-port) 0.016" ID ports | 33035256 | Stainless steel—analytical 0.010" ID x 1/16" OD tubing |
| 494C2H2000 | Analytical stainless steel valve (2-position, 10-port) 0.016" ID ports | | |
| 494C52006 | High-pressure stainless steel multi-position valve (6-position, 6-port) 0.016" ID ports | | |
| 494C5H2000 | High-pressure stainless steel multi-position valve (10-position, 10-port) 0.016" ID ports | | |
| 494C22Z3186 | Preparative PPS valve (2-position, 6-port) 0.030" ID ports | 33035257 | PEEK—prep 0.030" ID x 1/16" OD tubing |
| 494C22Z3180 | Preparative PPS valve (2-position, 10-port) 0.030" ID ports | | |
| 494C253186 | Low-pressure PPS multi-position valve (6-position, 6-port) 0.030" ID ports | | |
| 494C52346 | High-pressure PEEK multi-position valve (6-position, 6-port) 0.016" ID ports | 33035258 | PEEK—analytical 0.010" ID x 1/16" OD tubing |
| 494C5H2340 | High-pressure PEEK multi-position valve (10-position, 10-port) 0.016" ID ports | | |
| 494C256186 | Low-pressure PPS multi-position valve (6-position, 6-port) 0.060" ID ports | 33035259 | TFE 0.060" ID x 1/8" OD tubing |
| 494C256188 | Low-pressure PPS multi-position valve (8-position, 8-port) 0.060" ID ports | | |

## Other Accessories

Based on your configuration, you may also receive one of the following accessories, ordered separately.

| *Part Number* | *Description* |
|---|---|
| 3303522 | VALVEMATE II connector plate |
| 33035261 | Remote cable |

## Customer Service

Gilson, Inc. and its worldwide network of authorized representatives provide customers with the following types of assistance: sales, technical support, applications, and instrument repair.

If you need assistance, please contact your Gilson-authorized representative. Specific contact information can be found on the Gilson website at www.gilson.com. To help us serve you quickly and efficiently, please refer to **Before Calling Us** on page 5-5.

## Technical Specifications

Please be aware of the following before operating the VALVEMATE II.

**Warning!** Changes or modifications to the VALVEMATE II not expressly approved by Gilson could void the factory-authorized warranty.

The VALVEMATE II has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC commercial environment. The VALVEMATE II generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of the VALVEMATE II in a residential area is likely to cause harmful interference; in which case, the user will be required to correct the interference at the user's own expense.

Shielded cables must be used with the VALVEMATE II to ensure compliance with the Class A FCC limits.

| *Technical Specification* | *Definition* | |
|---|---|---|
| **Available valves** | ***Part Number*** | ***Description*** |
| | 494C22006 | Analytical stainless steel valve<br>(2-position, 6-port) 0.016" ID ports<br>5000 psi liquid, 75°C max |
| | 494C2H2000 | Analytical stainless steel valve<br>(2-position, 10-port) 0.016" ID ports<br>5000 psi liquid, 75°C max |
| | 494C23006 | Preparative stainless steel valve<br>(2-position, 6-port) 0.030" ID ports<br>5000 psi liquid, 75°C max |
| | 494C23000 | Preparative stainless steel valve<br>(2-position, 10-port) 0.030" ID ports<br>3500 psi liquid, 75°C max |
| | 494C22Z3186 | Preparative PPS valve<br>(2-position, 6-port) 0.030" ID ports<br>100 psi gas/250 psi liquid, 75°C max |
| | 494C22Z3180 | Preparative PPS valve<br>(2-position, 10-port) 0.030" ID ports<br>100 psi gas/250 psi liquid, 75°C max |
| | 494C52006 | High-pressure stainless steel multi-position valve<br>(6-position, 6-port) 0.016" ID ports<br>5000 psi liquid, 75°C max |
| | 494C5H2000 | High-pressure stainless steel multi-position valve<br>(10-position, 10-port) 0.016" ID ports<br>5000 psi liquid, 75°C max |
| | 494C52346 | High-pressure PEEK multi-position valve<br>(6-position, 6-port) 0.016" ID ports<br>5000 psi liquid, 50°C max |

| *Technical Specification* | *Definition* | |
|---|---|---|
| **Available valves (continued)** | ***Part Number*** | ***Description*** |
| | 494C5H2340 | High-pressure PEEK multi-position valve (10-position, 10-port) 0.016" ID ports<br>5000 psi liquid, 50°C max |
| | 494C53006 | High-pressure stainless steel multi-position valve (6-position, 6-port) 0.030" ID ports<br>5000 psi liquid, 75°C max |
| | 494C253186 | Low-pressure PPS multi-position valve (6-position, 6-port) 0.030" ID ports<br>100 psi gas/250 psi liquid, 75°C max |
| | 494C256186 | Low-pressure PPS multi-position valve (6-position, 6-port) 0.060" ID ports<br>100 psi gas/250 psi liquid, 75°C max |
| | 494C256188 | Low-pressure PPS multi-position valve (8-position, 8-port) 0.060" ID ports<br>100 psi gas/250 psi liquid, 75°C max |
| **Control** | • Computer control by TRILUTION™ Software and GSIOC (RS-232 to GSIOC interface is needed)<br>• Remote control by contact closure (with remote cable, part number 33035261, ordered separately)<br>• Manual control by front panel operation | |
| **Environmental conditions** | Indoor use<br>Altitude: up to 2000 m<br>Temperature range: 5°–40°C<br>Air pressure: 75–105 kPa<br>Pollution degree: 1 or 2, in accordance with IEC 66<br>Humidity: Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C | |

| *Technical Specification* | *Definition* |
|---|---|
| **Front panel** | Two arrow keys to advance valve position and two seven-segment blue LED displays |
| **Liquid contact materials** | Refer to ***Appendix B, Valve Flow Path Diagrams and Materials*** for more information.<br><br>Nitronic 60 (N60), Valcon H<br><br>*Valves*<br>494C22006, 494C2H2000, 494C23006, 494C23000, 494C52006, 494C5H2000, 494C53006<br><br>PPS, Valcon E2<br><br>*Valves*<br>494C22Z3186, 494C22Z3180, 494C253186, 494C256186, 494C256188<br><br>PAEK, Valcon E<br><br>*Valves*<br>494C52346, 494C5H2340 |
| **Manufacturing standards** | Meets applicable Safety and EMC certification standards; UL and CE certified. |
| **Physical space requirement** | 8.3 x 15.6 x 9.8 cm (3.3 x 6.2 x 3.9 in) |
| **Power requirements** | +24V DC at 2.0A supplied via a 2.1 mm ID power plug; center contact is positive |
| **Valve switching speed (msec)** | ≤200 msec depending on valve |
| **Weight** | 1.04 kg (2.29 lbs.) No valve installed. |

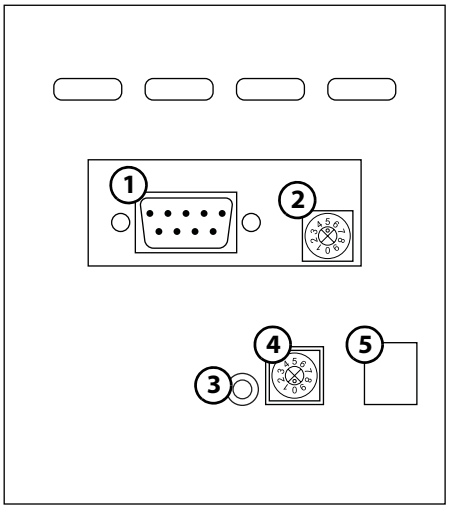
# Installation 2

This section takes you through the steps for setting up your VALVEMATE II.

# Electrical Connections

## Rear Panel

Please read this entire section and refer to the rear panel diagram below before making any electrical connections. Do not turn on power to the VALVEMATE II until all connections have been made.




**VALVEMATE II rear panel**

1 GSIOC

2 Unit ID

3 ROTATE/HOME (Contact Connection)

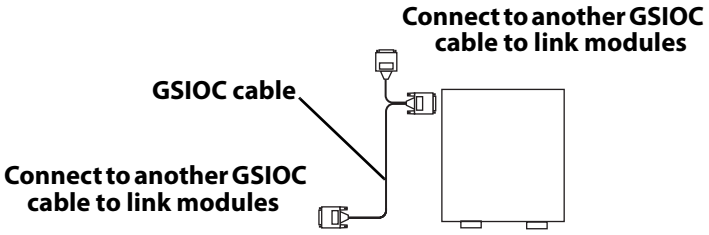
4 Valve selector (refer to page 2-5 for information on this setting)

5 Power receptacle

## GSIOC

Gilson systems feature a two-way communication interface between the computer and most Gilson modules. Communication occurs along the Gilson Serial Input/Output Channel (GSIOC).

Use the GSIOC cable, supplied in the accessory package, to link the VALVEMATE II to other GSIOC modules. Refer to the diagram below.




Use the female connector, located individually at one end of the cable, to connect the GSIOC cable to another GSIOC cable in the system. Tighten the retaining screws.

Connect the other female connector, located on the same end as the male connector, to the VALVEMATE II. Tighten the retaining screws.

Use the male connector to join another GSIOC cable and make the necessary connection to the next Gilson module.

### Unit ID

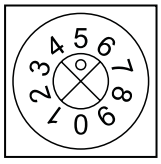
The unit ID identifies the VALVEMATE II to Gilson software packages that can issue GSIOC commands to the VALVEMATE II.

At the factory, Gilson set the unit ID to 35. There is no need to change this number unless it is the same as that assigned to another Gilson device that's also connected along the GSIOC. If you are using more than one VALVEMATE II you will need to change the default unit ID on one of them.

To change the unit ID:

1 Gently insert a small Phillips screwdriver into the selector on the rear panel and turn it.

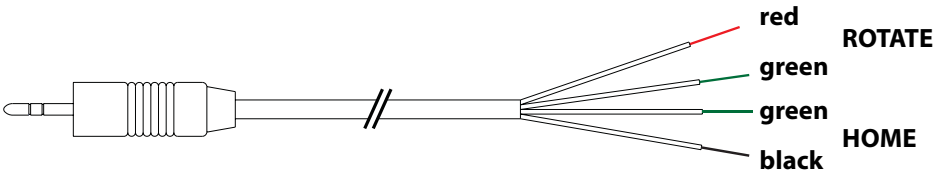
2 Align the white dot with one of the indicated numbers. The unit ID is 30 plus the selected number.



## Contact Connections (ROTATE/HOME)

The VALVEMATE II can receive contact closure input from other devices to rotate and home the valve.

To make contact connections, use the remote cable (ordered separately, part number 33035261). This cable has a 3-conductor plug that connects to the ROTATE/HOME port on the rear panel (refer to the diagram on page 2-2). The other end of the cable contains four tinned wires.



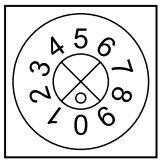

Connect the tinned wires to the contact closure outputs of the device, according to the instrument's user's guide.

To determine the state of the ROTATE or HOME input contact, use the appropriate GSIOC command (refer to ***Appendix C, GSIOC Commands***).

## Valve Selection

The valve selector identifies the type of installed valve. Refer to the table below for valve information.

To change the valve selector:




1 Gently insert a small Phillips screwdriver into the selector on the rear panel and turn it.

2 Align the white dot with one of the indicated numbers.

| *Setting* | *Part Number* | *Positions* | *Ports* |
|---|---|---|---|
| **0** | 494C22006<br>494C23006<br>494C22Z3186 | 2 | 6 |
| **2** | 494C2H2000<br>494C23000<br>494C22Z3180 | 2 | 10 |
| **6** | 494C52006<br>494C53006<br>494C52346<br>494C253186<br>494C256186 | 6 | 6 |
| **7** | 494C256188 | 8 | 8 |
| **8** | 494C5H2000<br>494C5H2340 | 10 | 10 |

## Power Connection

Use the DC power supply and power supply cable, supplied with the VALVEMATE II, to make the connection between the +24V DC power receptacle and a power source.

# Valve Installation

Follow these directions to install a valve if it was not factory-installed by Gilson. VALVEMATE II-compatible valves are listed in ***Appendix A, Replacement Parts and Accessories***.

## Before You Begin

Locate the following:

- valve
- 9/64" Allen wrench, supplied with the VALVEMATE II

## Installing the Valve

To install the valve:

1 Home the VALVEMATE II by pressing both of the arrow keys on the front panel at the same time.

2 Disconnect the power supply from the VALVEMATE II.

3 Set the valve selector to the appropriate value. Refer to **Valve Selection** on page 2-5.

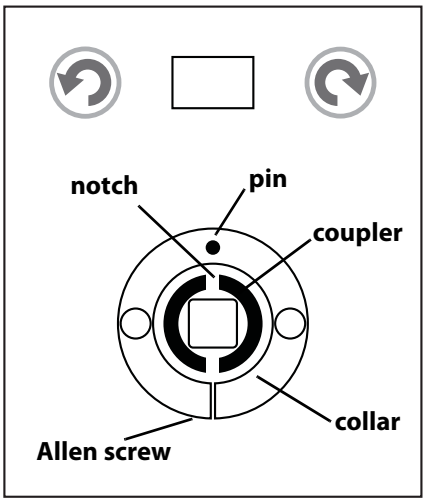
4 Ensure that the coupler on the collar is oriented so the notch in the coupler is aligned with the pin on the top (as shown).

If the coupler is not oriented correctly, remove using needle-nose pliers. Rotate to the correct orientation and re-install.

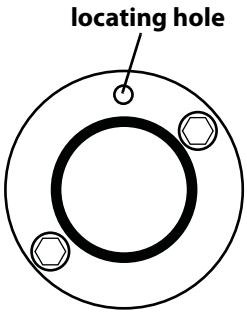
5 Place the valve on the instrument and tighten the Allen screw.

**Note:** The locating hole on the top of the valve should line up with the pin on the front of the collar.

6 Reconnect the power supply to the VALVEMATE II.




**front of the VALVEMATE II with no valve installed**




**back of valve**

## Checking Valve Position and Liquid Flow

Refer to the appropriate procedures below.

**Multi-position valve (494C52006, 494C5H2000, 494C52346, 494C5H2340, 494C53006, 494C253186, 494C256186, 494C256188)**

To verify that the valve is properly installed:

1 Fill a syringe.

2 Connect the syringe to the center port and dispense liquid into the port.

3 Verify that the liquid exits port 1. If it does not, the valve may not have been homed. Refer to **Placing the valve in its home position** below.

4 Press the counterclockwise arrow key.

5 Dispense additional liquid into the center port.

6 Verify that the liquid exits port 2.

**Two-position valve (494C22006, 494C2H2000, 494C23006, 494C2H3000, 494C22Z3186, 494C22Z3180)**

To verify that the valve is properly installed:

1 Fill a syringe.

2 Connect the syringe to port 2 and dispense liquid into the port.

3 Verify that the liquid exits port 3. If it does not, the valve may not have been homed. Refer to **Placing the valve in its home position** below.

4 Press one of the arrow keys.

5 Dispense additional liquid into port 2.

6 Verify that the liquid exits port 1.

### Placing the valve in its home position

Remove the valve from the instrument. Using needle-nosed pliers, turn the valve so the pin on the back of the valve is vertical (aligned with the locating hole). Then re-install the valve and check the flow using a syringe. If the liquid is flowing out of the port opposite port 1 (port 4 in a 6-port valve or port 6 in a 10-port valve), turn the valve 180 degrees with the needle-nosed pliers, re-install the valve, and check the flow using the syringe.

# Plumbing Connections

Before making the connections, locate one of the following plumbing packages (ordered separately):

**Note:** All packages include surplus tubing and fittings.

| | *Part Number* | *Qty* | *Description* |
|---|---|---|---|
| Stainless steel plumbing package—prep 0.030" ID x 1/16" OD tubing | 499331519 | 2 | Stainless steel tubing, 0.030" ID x 0.062 (1/16") OD x 5 ft |
| | 494LZN1-10 | 1 | Valco LZN1-10 stainless steel nut (0.75" long) for 1/16" OD tubing, package of 10 |
| Part number 33035255 | 490318021 | 1 | Valco ZF1S6-10 Type 316 stainless ferrules (1/16"), package of 10 |
| Stainless steel plumbing package—analytical 0.010" ID x 1/16" OD tubing | 499311519 | 2 | Stainless steel tubing, 0.010" ID x 0.062 (1/16") OD x 5 ft |
| | 494LZN1-10 | 1 | Valco LZN1-10 stainless steel nut (1/16", 0.75" long), package of 10 |
| Part number 33035256 | 490318021 | 1 | Valco ZF1S6-10 Type 316 stainless ferrules (1/16"), package of 10 |
| PEEK plumbing package—prep 0.030" ID x 1/16" OD tubing | 49953059 | 2 | PEEK tubing, 0.030" ID x 0.062 (1/16") OD x 5 ft |
| | 494LZN1PK-10 | 1 | Valco LZN1PK-10, PEEK nut (0.87" long) for 1/16" OD tubing, package of 10 |
| Part number 33035257 | 490318051 | 1 | Valco ZF1PK-10 PEEK ferrule (1/16") package of 10 |
| PEEK plumbing package—analytical 0.010" ID x 1/16" OD tubing | 49951059 | 2 | PEEK tubing, 0.010" ID x 0.062 (1/16") OD x 5 ft |
| | 494LZN1PK-10 | 1 | Valco LZN1PK-10, PEEK nut (0.87" long) for 1/16" OD tubing, package of 10 |
| Part number 33035258 | 490318051 | 1 | Valco ZF1PK-10 PEEK ferrule (1/16") package of 10 |
| TFE plumbing package 0.060" ID x 1/8" OD tubing | 495032 | 1 | TFE Tubing, 1.5 mm ID x 3.0 mm OD (1/8"); 10 ft/pkg |
| | 49041017P | 1 | Upchurch P-301 NUT, FLANGELESS, 1/8 IN, 1/4-28, DELRIN® (ACETAL), BLACK, pkg of 10 |
| Part number 33035259 | 49041015P | 1 | Upchurch P-300 FERRULE, FLANGELESS, 1/8 IN, TEFZEL® (ETFE), YELLOW), pkg of 10 |

## Plumbing Setup

Plumb the VALVEMATE into your system as required by your application.

The fittings you will use depend on the OD of the tubing connected to the valve. Tubing and fittings are included with each of the plumbing packages listed on page 2-9.

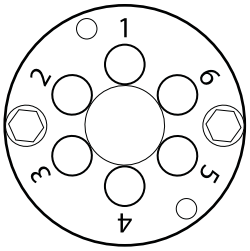
Slide the nut and ferrule onto the piece of tubing. Let the end of the tubing extend past the end of the ferrule.

When connecting the tubing to the port, make sure the tubing presses against the bottom of the port before you tighten the nut.

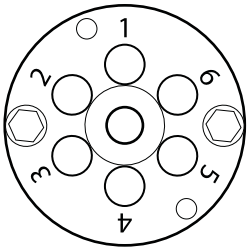
### Stainless steel plumbing package—prep 0.030" ID x 1/16" OD tubing

Part number 33035255

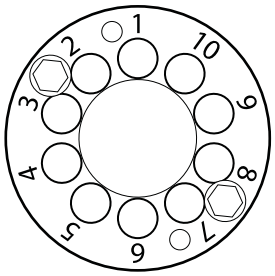
**0.030" ID x 1/16" OD stainless steel tubing**




**494C23006**



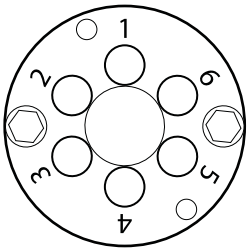

**494C53006**



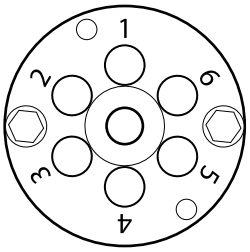

**494C23000**

## Stainless steel plumbing package—analytical 0.010" ID x 1/16" OD tubing

Part number 33035256



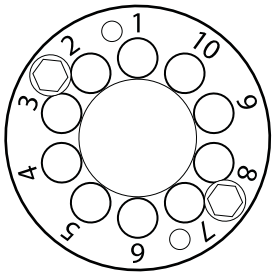

**494C22006**



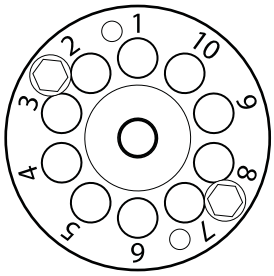

**494C52006**

**LZN1** **ZF1S6**

**0.010" ID x 1/16" OD stainless steel tubing**



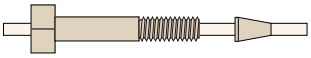

**494C2H2000**



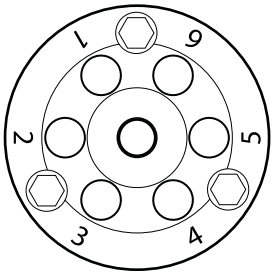

**494C5H2000**

## PEEK plumbing package—prep 0.030" ID x 1/16" OD tubing

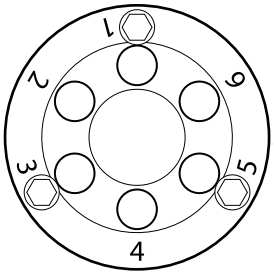
Part number 33035257



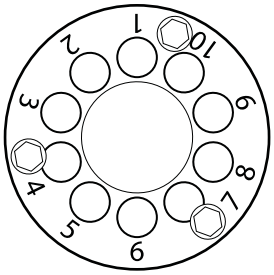

**0.030" ID x 1/16" OD PEEK tubing**




**494C253186**



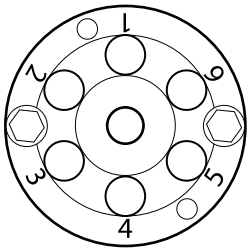

**494C22Z3186**




**494C22Z3180**

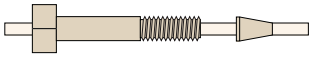
## PEEK plumbing package—analytical 0.010" ID x 1/16" OD tubing

Part number 33035258

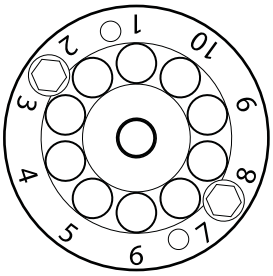



494C52346

LZN1PK ZF1PK



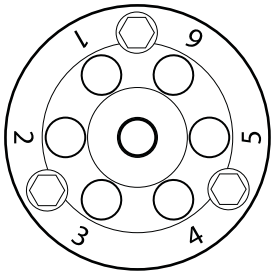
0.010" ID x 1/16" OD PEEK tubing




494C52340

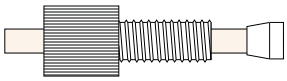
## TFE plumbing package 0.060" ID x 1/8" OD tubing

Part number 33035259

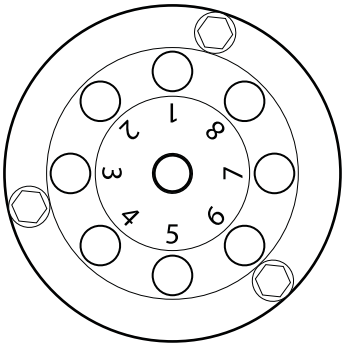



494C256186

P-301 P-300



0.060" ID x 1/8" OD TFE tubing




494C256188

## Connector Plate Installation

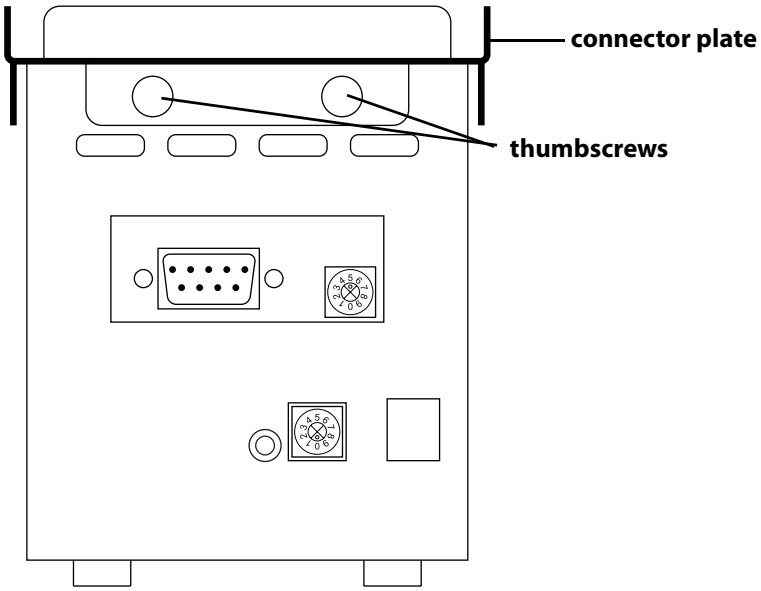
A connector plate (part number 3303522, ordered separately) is available for stacking multiple VALVEMATE II units.

To install the connector plate:

1 Place the connector plate on the top of the VALVEMATE II. The back of the connector plate has one edge that goes up and one edge that goes down, this should be placed at the back of the VALVEMATE II.

2 Place the thumbscrews through the connector plate to the holes on the VALVEMATE II and tighten.

3 Place the second VALVEMATE II on the connector plate.




**connector plate installed on the VALVEMATE II (rear panel)**

# Operation 3

This section describes how to control the VALVEMATE II. You can control the VALVEMATE II using TRILUTION™ Software, the front panel, contact closures, or Gilson Serial Input/Output Channel (GSIOC).

## Front Panel

The front panel contains two arrow keys and an LED display that shows valve position.

The arrow keys can be used to rotate the installed valve.

Use this arrow key to rotate the valve counterclockwise.

Use this arrow key to rotate the valve clockwise.

### If You See an Error

If an error message appears on the display, refer to ***Chapter 5, Troubleshooting***.

# Maintenance 4

The VALVEMATE II was designed to require minimal maintenance. Keep the unit clean. Wipe the unit with a soft cloth dampened with a mild detergent and disinfect as needed.

# Valve Replacement

Follow these directions to replace the currently installed valve. VALVEMATE II-compatible valves are listed in ***Appendix A, Replacement Parts and Accessories***.

## Before You Begin

Locate the following:

- replacement valve
- 9/64" Allen wrench, supplied with the VALVEMATE II

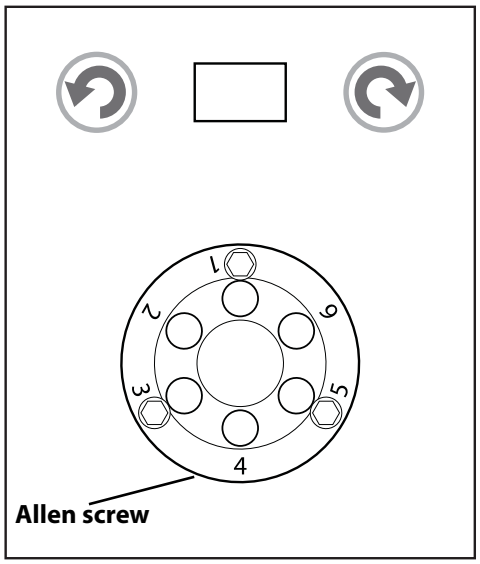
## Removing the Installed Valve

To remove the currently installed valve:

1 Home the valve by pressing both of the arrow keys on the front panel at the same time.

2 Disconnect the power supply from the VALVEMATE II.

3 Using a 9/64" Allen wrench, loosen the Allen screw on the bottom side of the valve to remove the valve from the instrument.




**front of VALVEMATE II with valve installed**

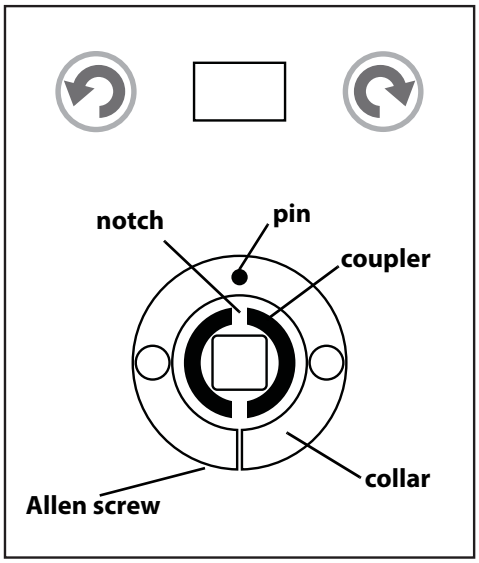
## Installing the Replacement Valve

To install the replacement valve:

1 Set the valve selector to the appropriate value for the replacement valve. Refer to **Valve Selection** on page 2-5.

2 Ensure that the coupler on the collar is oriented so the notch in the coupler is aligned with the pin on the top (as shown below).

If the coupler is not oriented correctly, remove using needle-nose pliers. Rotate to the correct orientation and re-install.

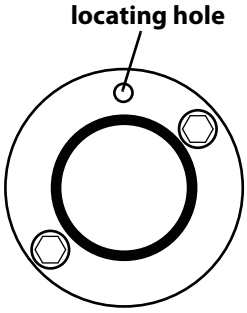



**front of VALVEMATE II with valve removed**

3 Place the valve on the instrument and tighten the Allen screw.

**Note:** The locating hole on the top of the valve should line up with the pin on the front of the collar.

4 Reconnect the power supply to the VALVEMATE II.




**back of valve**

# Troubleshooting 5

If you encounter a problem while operating the VALVEMATE II, refer to the following pages. If you cannot solve or isolate the problem, contact your Gilson-authorized representative. See **Before Calling Us** on page 5-5.

## Error Messages

If an error message appears on the VALVEMATE II, refer to the following table.

| *Error* | *Description* | *Possible Cause and Solution* |
|---|---|---|
| 0 | No error | |
| 1 | Unknown command | Unknown command. Clear the error and send a known legal command. |
| 2 | Invalid NV-RAM address | Attempt to write to an NV-RAM address that doesn't exist.<br><br>Contact Gilson for information regarding correct NV-RAM addresses. |
| 3 | Move while busy | Attempt to switch the valve while the valve is still moving. Wait for the current command to execute before sending another. |
| 4 | Positioning error | The VALVEMATE is having difficulty rotating the valve. Ensure that the correct setting is selected on the valve selector. |
| 5 | Invalid command parameter | A numerical parameter was out of range. Clear the error using the buffered e command. Then, enter a numerical parameter within the range. |
| 6 | Homing error | Error occurred during homing. Ensure that the appropriate number is selected on the valve selector on the rear panel.<br><br>Turn power OFF then ON to the VALVEMATE II. |
| 7 | Move while unhomed | Attempt to move before the valve was homed. Send the buffered H command to home the valve. |
| 8 | Invalid setting | Invalid setting on valve switches or user defined parameters. |

# Troubleshooting

## Unit not operational

- Check power cord connection
- Try different outlet
- Check all connections

## VALVEMATE II making an erratic noise when moving the valve

- The valve may not have been in home position when installed in the VALVEMATE II. Refer to **Placing the valve in its home position** on page 2-8.

## Input functions not operating

- Check 3-conductor plug connection to the ROTATE/HOME port
- Make sure wire connections to the other device are secure
- Check connections for proper pin assignments on the device supplying input to the VALVEMATE II
- Confirm that device supplying input to the VALVEMATE II is turned ON and working properly
- Make sure that the pulse to the VALVEMATE II is at least 0.1 second in duration

## Fluid flowing from wrong port or not flowing from any port

- The valve may be misaligned; turn power OFF then ON to the VALVEMATE II
- The valve may not have been in home position when installed in the VALVEMATE II. Refer to **Placing the valve in its home position** on page 2-8.
- The valve may be incorrectly plumbed
- Fluid may not be reaching the valve; if connected to a pumping system, lower system pressure and disconnect the valve's inlet tubing to determine if fluid is reaching the valve

## Low flow rate

- Check for leaks in tubing

## High back pressure

- The valve may be incorrectly plumbed

# Repair and Return Policies

## Before Calling Us

Gilson-authorized representatives will be able to serve you more efficiently if you have the following information:

- the serial number and model number of the instruments involved. The serial number is located on the bottom of the VALVEMATE II.
- the installation procedure you used
- list of concise symptoms
- list of operating procedures and conditions you were using when the problem arose
- list of other devices connected to the VALVEMATE II and a description of those connections
- valve installed in the VALVEMATE II
- list of other electrical connections in the room

## Warranty Repair

Units covered under warranty will be repaired and returned to you at no charge. If you have any questions about applicability, please contact your local distributor.

## Non-Warranty Repair

For out-of-warranty repairs, contact your local distributor. A Customer Service representative will discuss service options with you and can assist in making arrangements to return the equipment, if necessary.

## Rebuilt Exchange

For some units, rebuilt exchange components are available. Contact your local distributor for details.

## Return Procedure

Contact your local distributor's Customer Service Department to obtain authorization before returning any Gilson equipment. To return a piece of equipment:

- Carefully pack the unit to prevent damage in transit. Check with your distributor regarding proper method of shipment. No responsibility is assumed by Gilson or your distributor for damage caused by improperly packaged instruments. Indicate the authorization on the carton and on the packing slip.
- Always insure for the replacement value of the unit.
- Include a description of symptoms, your name, address, phone number, and purchase order to cover repair costs, return and shipping charges, if your institution requires it.

## Unit End-of-Life

When a unit reaches the end of its useful life, refer to www.gilson.com for directions and information on the end-of-life policy. This is in accordance with the European Union Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).

# Replacement Parts and Accessories A

## Valves

| *Part Number* | *Description* |
|---|---|
| 494C22006 | Analytical stainless steel valve (2-position, 6-port) with Valcon H rotor. 0.016" ID ports, 1/16" tubing and fittings |
| 494C2H2000 | Analytical stainless steel valve (2-position, 10-port) with Valcon H rotor. 0.016" ID ports, 1/16" tubing and fittings |
| 494C23006 | Preparative stainless steel valve (2-position, 6-port) with Valcon H rotor. 0.030" ID ports, 1/16" tubing and fittings |
| 494C23000 | Preparative stainless steel valve (2-position, 10-port) with Valcon H rotor. 0.030" ID ports, 1/16" tubing and fittings |
| 494C22Z3186 | Preparative PPS valve (2-position, 6-port) with Valcon E2 rotor. 0.030" ID ports, 10-32" fittings, 1/16" tubing |
| 494C22Z3180 | Preparative PPS valve (2-position, 10-port) with Valcon E2 rotor. 0.030" ID ports, 10-32" fittings, 1/16" tubing |
| 494C52006 | High-pressure stainless steel multi-position valve (6-position, 6-port) with Valcon H rotor. 0.016" ID ports, 1/16" tubing, 1/16" ZDV fittings |
| 494C5H2000 | High-pressure stainless steel multi-position valve (10-position, 10-port) with Valcon H rotor. 0.016" ID ports, 1/16" tubing, 1/16" ZDV fittings |
| 494C52346 | High-pressure PEEK multi-position valve (6-position, 6-port) with Valcon E rotor. 0.016" ID ports, 1/16" tubing, 1/16" ZDV fittings |

**Valves (Continued)**

| *Part Number* | *Description* |
|---|---|
| 494C5H2340 | High-pressure PEEK multi-position valve (10-position, 10-port) with Valcon E rotor. 0.016" ID ports, 1/16" tubing, 1/16" ZDV fittings |
| 494C53006 | High-pressure stainless steel multi-position valve (6-position, 6-port) with Valcon H rotor. 0.030" ID ports, 1/16" tubing and fittings |
| 494C253186 | Low-pressure PPS multi-position valve (6-position, 6-port) with Valcon E2 rotor. 0.030" ID ports, 1/16" tubing, 1/4"-28 fittings |
| 494C256186 | Low-pressure PPS multi-position valve (6-position, 6-port) with Valcon E2 rotor. 0.060" ID ports, 1/8" tubing, 1/4"-28 fittings |
| 494C256188 | Low-pressure PPS multi-position valve (8-position, 8-port) with Valcon E2 rotor. 0.060" ID ports, 1/8" tubing, 1/4"-28 fittings |

## Rotors

| *Part Number* | *Description* |
|---|---|
| 494C220R6 | Rotor, Valcon H, for 6-port analytical valve (part number 494C22006), 1/16" fittings, 0.016" ID ports |
| 494C0R0H | Rotor, Valcon H, for 10-port analytical valve (part number 494C2H2000), 1/16" fittings, 0.016" ID ports |
| 494C230R6 | Rotor, Valcon H, for 6-port preparative valve (part number 494C23006), 1/16" fittings, 0.030" ID ports |
| 494C230R0 | Rotor, Valcon H, for 10-port preparative valve (part number 494C23000), 1/16" fittings, 0.030" ID ports |
| 494C12316 | Rotor, Valcon E2, for 6-port valve (part number 494C22Z3186), 1/16" Valco ZDV fittings, 0.030" ID ports |
| 494C12310 | Rotor, Valcon E2, for 10-port valve (part number 494C22Z3180), 1/16" Valco ZDV fittings, 0.030" ID ports |
| 494C520R6 | Rotor, Valcon H, for 6-position HPLC stream selector (part number 494C52006), 1/16" fittings, 0.016" ID ports |
| 494C520R0H | Rotor, Valcon H, for 10-position HPLC stream selector (part number 494C5H2000), 1/16" fittings, 0.016" ID ports |
| 494C523R6 | Rotor, Valcon E, for 6-position HPLC stream selector (part number 494C52346), 1/16" fittings, 0.016" ID ports |
| 494C523R0H | Rotor, Valcon E, for 10-position HPLC stream selector (part number 494C5H2340), 1/16" fittings, 0.016" ID ports |
| 494C530R6 | Rotor, Valcon H, for 6-position valve (part number 494C53006), 1/16" fittings, 0.030" ID ports |
| 494C25316 | Rotor, Valcon E2, for 6-position stream selector (part number 494C253186), 1/4-28 fitting details for 1/16" tubing, 0.030" ID ports |
| 494C25616 | Rotor, Valcon E2, for 6-position stream selector (part number 494C256186), 1/4-28 fitting details for 1/8" tubing, 0.060" ID ports |
| 494C25618 | Rotor, Valcon E2, for 8-position stream selector (part number 494C256188), 1/4-28 fitting details for 1/8" tubing, 0.060" ID ports |

## Plumbing Packages

| *Part Number* | *Description* |
|---|---|
| 33035255 | Stainless steel plumbing package—prep (0.030" ID x 1/16" OD tubing) |
| 33035256 | Stainless steel plumbing package—analytical (0.010" ID x 1/16" OD tubing) |
| 33035257 | PEEK plumbing package—prep (0.030" ID x 1/16" OD tubing) |
| 33035258 | PEEK plumbing package—analytical (0.010" ID x 1/16" OD tubing) |
| 33035259 | TFE plumbing package (0.060" ID x 1/8" OD tubing) |

## Tubing and Fittings

| *Part Number* | *Description* |
|---|---|
| 499331519 | Stainless steel tubing, 0.030" ID x 0.062 (1/16") OD x 5 ft |
| 499311519 | Stainless steel tubing, 0.010" ID x 0.062 (1/16") OD x 5 ft |
| 49953059 | PEEK tubing, 0.030" ID x 0.062 (1/16") OD x 5 ft |
| 49951059 | PEEK tubing, 0.010" ID x 0.062 (1/16") OD x 5 ft |
| 495032 | TFE Tubing, 1.5 mm ID x 3.0 mm OD (1/8"); 10 ft/pkg |
| 494LZN1-10 | Valco LZN1-10 stainless steel nut (0.75" long) for 1/16"OD tubing, package of 10 |
| 490318021 | VALCO ZF1S6-10 Type 316 stainless ferrules (1/16"), package of 10 |
| 494LZN1PK-10 | Valco LZN1PK-10, PEEK nut (0.87" long) for 1/16" OD tubing, package of 10 |
| 49031805 | Valco ZF1PK-10 PEEK ferrule (1/16") package of 10 |
| 49041017P | Upchurch P-301 NUT, FLANGELESS, 1/8 IN, 1/4-28, DELRIN® (ACETAL), BLACK, pkg of 10 |
| 49041015P | Upchurch P-300 FERRULE, FLANGELESS, 1/8 IN, TEFZEL® (ETFE), YELLOW), pkg of 10 |

### Cables and I/O Accessories

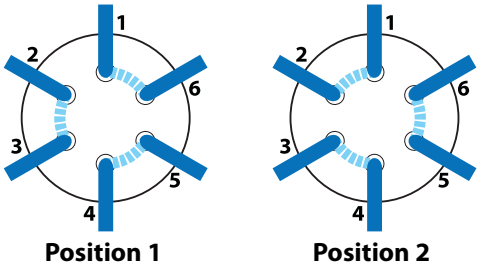
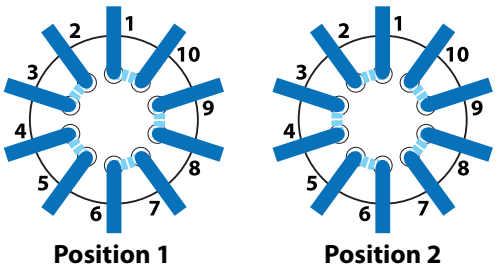
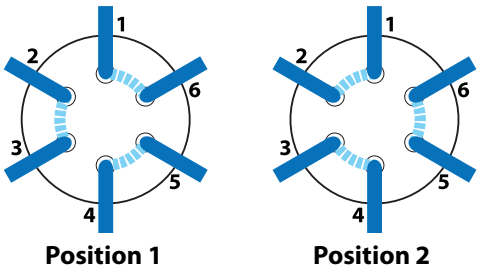
| *Part Number* | *Description* |
|---|---|
| 36078143 | GSIOC cable |
| 59444524 | power supply, 24V desktop universal |
| 7080318107 | power cord 110V |
| 7080316106 | power cord 220V |
| 33035261 | VALVEMATE II remote control cable assembly |

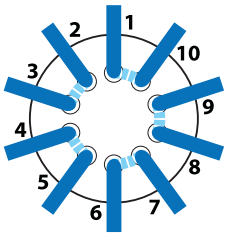
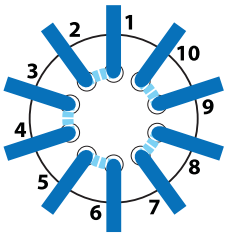
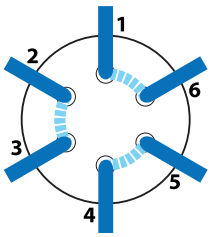
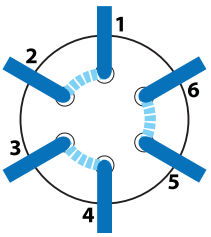
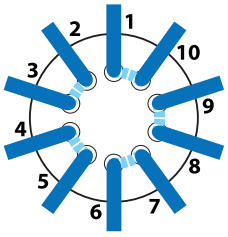
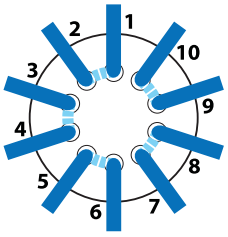
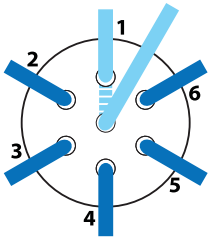
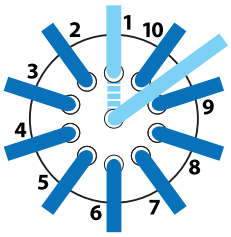
### Miscellaneous

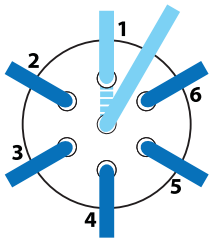
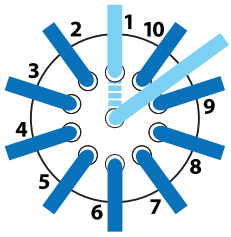
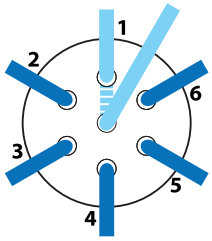
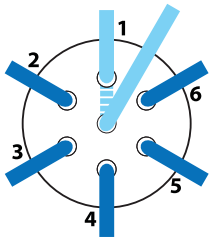
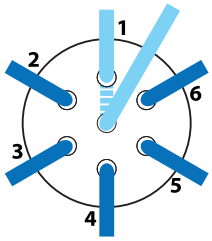
| *Part Number* | *Description* |
|---|---|
| 4311402 | 9/64" Allen wrench |
| 3303522 | VALVEMATE II connector plate |

# Valve Flow Path Diagrams and Materials B

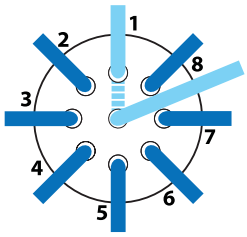
## Valve Flow Path Diagrams

| *Part Number* | *Description* | |
|---|---|---|
| 494C22006 | Analytical stainless steel valve (2-position, 6-port) with Valcon H rotor 0.016" ID ports, 1/16" tubing and fittings |  |
| 494C2H2000 | Analytical stainless steel valve (2-position, 10-port) with Valcon H rotor 0.016" ID ports, 1/16" tubing and fittings |  |
| 494C23006 | Preparative stainless steel valve (2-position, 6-port) with Valcon H rotor 0.030" ID ports, 1/16" tubing and fittings |  |

| *Part Number* | *Description* | |
|---|---|---|
| 494C23000 | Preparative stainless steel valve<br>(2-position, 10-port) with Valcon H rotor<br>0.030" ID ports, 1/16" tubing and fittings |  Position 1  Position 2 |
| 494C22Z3186 | Preparative PPS valve<br>(2-position, 6-port) with Valcon E2 rotor<br>0.030" ID ports, 10-32" fittings, 1/16" tubing |  Position 1  Position 2 |
| 494C22Z3180 | Preparative PPS valve<br>(2-position, 10-port) with Valcon E2 rotor<br>0.030" ID ports, 10-32" fittings, 1/16" tubing |  Position 1  Position 2 |
| 494C52006 | High-pressure stainless steel multi-position valve<br>(6-position, 6-port) with Valcon H rotor<br>0.016" ID ports, 1/16" tubing, 1/16" ZDV fittings |  |
| 494C5H2000 | High-pressure stainless steel multi-position valve<br>(10-position, 10-port) with Valcon H rotor<br>0.016" ID ports, 1/16" tubing, 1/16" ZDV fittings |  |

| *Part Number* | *Description* | |
|---|---|---|
| 494C52346 | High-pressure PEEK multi-position valve (6-position, 6-port) with Valcon E rotor 0.016" ID ports, 1/16" tubing, 1/16" ZDV fittings |   |
| 494C5H2340 | High-pressure PEEK multi-position valve (10-position, 10-port) with Valcon E rotor 0.016" ID ports, 1/16" tubing, 1/16" ZDV fittings |   |
| 494C53006 | High-pressure stainless steel multi-position valve (6-position, 6-port) with Valcon H rotor 0.030" ID ports, 1/16" tubing and fittings |   |
| 494C253186 | Low-pressure PPS multi-position valve (6-position, 6-port) with Valcon E2 rotor 0.030" ID ports, 1/16" tubing, 1/4"-28 fittings |   |
| 494C256186 | Low-pressure PPS multi-position valve (6-position, 6-port) with Valcon E2 rotor 0.060" ID ports, 1/8" tubing, 1/4"-28 fittings |   |

| *Part Number* | *Description* |
|---|---|
| 494C256188 | Low-pressure PPS multi-position valve (8-position, 8-port) with Valcon E2 rotor 0.060" ID ports, 1/8" tubing, 1/4"-28 fittings |



# Materials*

## Nitronic 60

Chemical resistance is similar to Type 316 stainless, but its resistance to galling and oxidation make it superior to Type 316 or 303 in the majority of applications.

## Stainless steel, Type 316

This is the standard tubing material for chromatography, suitable for a wide variety of applications. It is cold drawn seamless, not welded, with close tolerances held on both ID and OD. Type 316 is most commonly used for HPLC because of its superior chloride ion resistance.

## PAEK

Polyaryletherketone is the generic name for the family of polyketone compounds. PAEK includes PEK, PEEK, PEKK, and PEKEKK, which differ in physical properties and, to a lesser degree, in inertness.

A range of PAEK-based composites are used for valves and fittings. These composites resist all common HPLC solvents and dilute acids and bases. However, concentrated or prolonged use of halogenated solvents may cause the polymer to swell. Avoid concentrated sulfuric or nitric acids (over 10%).

## PEEK

Considered relatively inert and biocompatible, polyetheretherketone tubing can withstand temperatures up to 100°C. Under the right circumstances, 0.005"–.020" ID tubing can be used up to 5000 psi for a limited time, and 0.030" to 3000 psi. Larger IDs are typically good to 500 psi. These limits will be substantially reduced at elevated temperatures and in contact with some solvents or acids.

Its mechanical properties allow PEEK to be used instead of stainless in many situations and in some environments where stainless would be too reactive. However, PEEK can be somewhat absorptive of solvents and analytes, notably methylene chloride, DMSO, THF, and high concentrations of sulfuric and nitric acid. This tubing is highly prone to “kinking,” or sealing off, if held in a sharp bend over time.

## PPS

Polyphenylene sulphide. It is very resistant to all solvents, acids, and bases.

## Valcon E

A polyaryletherketone/PTFE composite. (Standard specs are 400 psi at 225°C, but higher pressure ratings are possible at reduced temperatures.) However, this polymer cannot be used in prolonged contact with high concentrations of sulfuric and nitric acids, DMSO, THF, or liquid methylene chloride.

## Valcon E2

A proprietary reinforced TFE composite, Valcon E2 works well at lower pressures and is suitable for temperatures up to 75°C. This material is resistant to most chemicals but should not be used in prolonged contact with high concentrations of sulfuric and nitric acids, DMSO, or liquid methylene chloride.

## Valcon H

This composite, a carbon fiber reinforced, PTFE lubricated inert engineering polymer, has long been the standard for typical HPLC applications in which pressures are around 5000 psi and temperatures are not more than 75°C.

* Information provided by Valco Instruments Company Inc.

# GSIOC Commands C

The Gilson Serial Input Output Channel (GSIOC) is an asynchronous serial communications interface that enhances the power of your Gilson equipment.

The GSIOC incorporates an EIA RS-485 interface and allows up to 32 slave devices to be controlled from a single master in a multi-drop configuration.

Each slave device is identified by a unique number which must be known to the device and to the controller. The default ID code of the VALVEMATE II is 35.

Using the computer and software, you:

- specify the VALVEMATE II as the device you want to control
- issue commands that set operating parameters, control operation, or request information from that device.

# GSIOC Commands

There are two kinds of commands that you can send over the GSIOC:

- **Buffered** commands send instructions to the VALVEMATE II. These commands are executed one at a time.
- **Immediate** commands request status information from the VALVEMATE II. These commands are executed immediately, temporarily interrupting other commands in progress.

## GSIOC Command List

In the command list on the following pages, the GSIOC command must be entered in the proper upper or lower case format. If a buffered command requires additional information, you'll see italicized text next to the command. The description of the command identifies what you need to enter in place of the italicized parameter. Also note that if a parameter is optional, it appears within brackets, [ ].

I = Immediate

B = Buffered

| *Command* | | *Description* | |
|---|---|---|---|
| % | I | Identifies the selected slave device. Returns character string: “ValveMate II vx.y.z” where x, y, and z represent the firmware version. | |
| $ | I | Returns “$” and resets the VALVEMATE II to the power on condition and homes the VALVEMATE II. | |
| ~9 | B | Resets the information in the non-volatile memory (NV-RAM). | |
| *@n[=x]* | B | Sets NV-RAM address and optionally sets location 'n' to value 'x'. | |
| @ | I | Returns: "n=x" where: | |
| | | n | the current NV-RAM address |
| | | x | the value that location contains. |
| ^ | I | Returns “eemppabcd” where: | |
| | | ee | error code |
| | | m | motor status |
| | | pp | valve position |
| | | abcd | CC and key input status |
| e | I | Returns “n” where n is one of the error codes listed below. Refer to **Error Messages** on page 5-2 for details on each error. | |
| | | 0 | No error |
| | | 1 | Unknown command |
| | | 2 | Invalid NV-RAM address |
| | | 3 | Move while busy |
| | | 4 | Positioning error |
| | | 5 | Invalid command parameter |
| | | 6 | Homing error |
| | | 7 | Move while unhomed |
| | | 8 | Invalid setting |
| e | B | Clear error conditions. | |
| H | B | Clears the error and moves the valve to its home position. | |

| *Command* | | *Description* | |
|---|---|---|---|
| K | I | Reads status of input and front keys. Returns “abcd” where: | |
| | | a | contact input HOME: 0 if open, 1 if closed |
| | | b | contact input ROTATE: 0 if open, 1 if closed |
| | | c | Counterclockwise arrow key |
| | | d | Clockwise arrow key |
| L*x* | B | Locks or unlocks the front panel depending on the value assigned to x: | |
| | | 0 | unlock front panel |
| | | 1 | lock front panel |
| L | I | Reads the front panel lock state. Returns “x” where: | |
| | | 0 | unlocked |
| | | 1 | locked |
| M | I | Reads the current motor position. Returns “s” where: | |
| | | P | Parked |
| | | R | Running |
| | | U | Unpowered |
| | | E | Error |
| P*x* | B | Moves the valve to the position set by x. | |
| P | I | Returns the current valve position (1–10). | |
| T | I | Returns “s-xxPs-yyPt” where: | |
| | | s | Valve selection switch setting |
| | | xx | Number of positions |
| | | yy | Number of ports |